

XVIII. *Life-history of sixty species of Lepidoptera observed in Mhow, Central India.* By R. W. FORSAYETH, Surgeon-Major, A. M. D.

[Read August 6th, 1884.]

PLATES XIV, XV.

DURING my residence at Mhow I have been enabled to make the following observations upon various Lepidoptera. The species have been named and arranged throughout by Mr. A. G. Butler, of the Natural History Department, British Museum, to whom I wish to return my best thanks. The following is a synopsis of the characters of the larvæ and pupæ observed:—

RHOPALOCERA.

- Papilio Erithonius*, L.—LARVA thick, abrupt, sluggish. Small hood. Concealed double erectile horn on hood. PUPA suspended by thoracic band and caudal ligature on leaf.
- Delias eucharis*, Drury.—LARVA vermiform, sparingly hirsute. PUPA suspended by thoracic band and caudal ligature on leaf.
- Terias Æsiope*, Mén.—LARVA vermiform, naked. PUPA pointed head, flattened thorax, suspended as above noted on leaf.
- Tirumala Limniace*, Cram. LARVA juliform, naked; two thoracic and two caudal horns. PUPA suspended by tail. Gold spots.
- Linnaea Chrysippus*, L.—LARVA juliform, naked; six long fleshy horns on body. PUPA suspended by tail. Gold band and puncta.
- Junonia Orithyia*, L.—LARVA armed with numerous hairy spines. Head bifid. PUPA suspended by tail, rough, yellow and purple.
- J. Euone*, L.—LARVA armed with numerous hairy spines. Head bifid. PUPA suspended by tail, rough, yellow and purple.
- Precis Lemonias*, L.—LARVA armed with numerous hairy spines. Head bifid. PUPA suspended by tail, rough, yellow and purple.
- Hypolimnias avia*, Fabr.—LARVA armed with numerous hairy spines. Head entire, with two horns on vertex. PUPA suspended by tail. Projections along abdomen and dorsum of thorax.
- Melanitis Ismene*, Cram.—LARVA oblong; head with two spined horns. Spindle-shaped body. PUPA smooth, suspended by tail.
- Symphædra thyclia*, Fabr.—LARVA, body surrounded by numerous long fleshy horizontal arms furnished with hairs. PUPA suspended by tail. Angular. Gold spots and lines.
- Pyrgus Galba*, Fabr.—LARVA vermiform. Head hairy, on a neck. PUPA fastened by spine at tail, in a leafy case. Greenish white efflorescence on body.

Pamphila Mathias, Fabr.—LARVA vermiform. Head triangular, on a neck. PUPA fastened on grass stem by thoracic band and caudal ligature. Smooth, with pointed head.

SPHINGES.

Daphnis nerii, L.—LARVA ocellated. Short soft caudal horn. PUPA of ordinary form. COCOON of silk and earth on or near surface of ground.

Polyptychus dentatus, Cram. — LARVA marked with puncta. Fleshy caudal horn. PUPA ordinary. COCOON: Earthen cell; subterraneous.

Acherontia Styx, Westw.—LARVA green. Yellow lateral striæ. Fleshy pointed caudal horn. LARVA brown and white. Dark lateral striæ. Dark brown row of patches on dorsum of thorax. Fleshy pointed caudal horn. PUPA ordinary. COCOON: Earthen cell; subterraneous.

Chærocampa celerio, L.—LARVA ocellated. Long acuminate caudal horn. PUPA: Head of pupa keel-shaped. COCOON: Silk, earth, and leaves, on surface of ground.

C. thyelia, L.—LARVA ocellated. Short acuminate caudal horn. PUPA: Head keel-shaped. COCOON: Leaves and silk, on surface of ground.

C. Oldenlandiæ, Fabr.—LARVA ocellated. Long acuminate caudal horn. PUPA: Head keel-shaped. COCOON: Leaves, or earth and silk, on surface of ground.

Protoparce orientalis, Butl.—LARVA marked with lateral striæ. Long acuminate caudal horn. PUPA with large detached maxillary sheath. COCOON: An earthen cell; subterraneous.

Clanis cervina, Walk.—YOUNG LARVA: Large acuminate head. Strong pointed caudal horn. Lateral striæ. MATURE LARVA: Rounded head. Short fleshy caudal horn. Lateral striæ; rough skin. PUPA, ordinary form. COCOON: An earthen cell; subterraneous.

C. Deucalion?, Walk.—LARVA with lateral striæ. Short soft caudal horn. PUPA, ordinary form. COCOON: An earthen cell; subterraneous.

BOMBYCES.

Trilocha albicollis, Walk.—LARVA sphingiform, naked. COCOON: Firm yellow silk, oblong-oval, on leaf.

Dabarita subtilis, Walk.—LARVA smooth, bladder-headed. COCOON: Boat-shaped, silk, firm, on leaf.

Chilena strigula, Walk.—LARVA hairy; three long tufts. COCOON: Strong silk, oblong-oval, arboreal.

Trabala Vishnu, Lef.—LARVA hairy; two head tufts. COCOON: Silken, arboreal, irregular shape.

Megasoma venustum, Walk.—LARVA hairy; thoracic brush and patch. COCOON: Strong silken, oblong-oval, arboreal.

Lebeda Buddha, Lef.—LARVA hairy; thoracic brush and patch. COCOON: Strong silken, oblong-oval, arboreal.

Nioda fusiformis, Walk.—LARVA hairy, tufted; thoracic brushes. Caudal arrow-headed plumes. COCOON: Silk and hairs, arboreal; hammock-like.

Psalis securis, Hübn.—LARVA hairy; head tufts; dorsal brushes. COCOON: Silk, arboreal, oblong-oval.

Euproctis lunata, Walk.—LARVA hairy; dorsal brushes. COCOON: Bags of silk and clay, under but near surface of ground.

- Pseudomesa incerta*, Walk.—LARVA: Short scanty hairs; no brushes or tufts. COCOON: Thin silk hammock.
- Perina nuda*, Fabr.—LARVA sparingly hirsute; large head; no brushes or tufts. No cocoon. PUPA suspended by silk fibres on leaf.
- Trisula variegata*, Moore.—LARVA: Scanty and long hairs; fleshy grub-like. COCOON: Sand and stones bound together with strong silk, on surface of ground.
- Alope ricini*, L.—LARVA hairy, in whorls; no tufts or brushes. COCOON: Silk and hairs, arboreal, hammock-like.
- Cretonotus interruptus*, L.—LARVA hairy, in whorls; no tufts or brushes. (No notes of COCOON.)
- Arcas lacticea*, Cram.—LARVA hairy, in whorls; no tufts or brushes. COCOON: Silk and earth, on and partly under surface of ground.
- Lacides ficus*, Fabr.—LARVA sparingly hirsute; hairs longish; legs normal. COCOON: Earthen cell; subterranean. No efflorescence on PUPA.
- Miresa albipuncta*, H.-S.—LARVA slug-like, spined, stinging. COCOON hard, oval, egg-like; subterranean.
- Aphendala tripartita*, Moore.—LARVA slug-like, spined, stinging. COCOON hard, oval, egg-like; subterranean.
- Parasa lepida*, Cram.—LARVA slug-like, spined, stinging. COCOON hard, oval, egg-like, on the trunk and branches of the mango tree.

NOCTUÆ.

- Sphingomorpha chlorea*, Cram.—LARVA: Anterior pair of prolegs small, naked, semi-looping; concealed dorsal bar. COCOON silk and clay; subterranean. No efflorescence on PUPA.
- Achea melicerta*, Drury.—LARVA: Anterior pair of prolegs rudimentary, naked, semi-looping; concealed dorsal bar. COCOON leaf and silk, arboreal. White efflorescence on PUPA.
- Ophiodes separans*, Walk.—LARVA: Anterior pair of prolegs small, naked; movement not noted; no concealed dorsal bar. COCOON leaf and silk, arboreal. No efflorescence on PUPA.
- Homoptera solita*, Walk.—Two anterior pairs of prolegs obsolete, looping; no bar. COCOON leaf and silk, arboreal. No note of efflorescence.
- H. continua*, Walk.—LARVA: 1st pair of prolegs obsolete, 2nd rudimentary; semi-looping. COCOON leaf and silk, arboreal. White efflorescence on PUPA.
- Cosmophila indica*, Guén.—LARVA semi-looping (no other notes). COCOON arboreal, rolled leaf. No note of efflorescence.
- Ercheia diversipennis*, Walk.—No figure. I think it was a semi-looper. COCOON leaf and silk, arboreal. No note of efflorescence.
- Selepa celtis*, Moore.—LARVA hairy; movements normal; feet normal. COCOON boat-shaped, silk, on a leaf. No note of efflorescence.
- S. curviferella*, Walk.—LARVA hairy; movements normal; feet normal. COCOON of silk and clay; subterranean. No note of efflorescence.
- Tegna hyblælla*, Walk.—LARVA maggot-like, translucent, naked, soft. Legs normal. COCOON dense, leathery, seed-like. On a leaf, under a silk net.
- Glottula dominica*, Cram.—LARVA sparingly hirsute; short hairs; legs regular. COCOON: Earthen cell; subterranean. No efflorescence on PUPA.
- Heliothis armiger*, Hübn.—LARVA naked, sphingiform. COCOON: Earthen cell; subterranean. No efflorescence on PUPA.

Prodenia retina, Guén.—LARVA naked, sphingiform. COCOON: Earthen cell; subterraneous. No efflorescence on PUPA.

Plusia chrysitina, Martyn.—LARVA naked, sphingiform; two anterior pairs of prolegs obsolete; looping; no concealed dorsal bar. PUPA in net of silk, in roll of leaf. No efflorescence.

Celana canorufa, Walk.—LARVA naked, sphingiform, almost semi-looping. PUPA in earthen cell; subterraneous. No efflorescence.

Remigia frugalis, Fabr.—LARVA naked, semi-looper. PUPA in earthen cell; subterraneous. No efflorescence.

GEOMETRÆ.

Hypochroma dispensata, Walk.—LARVA naked, looping. PUPA on surface of ground under a thin net.

PYRALES.

Scopula strenualis, Walk.—LARVA maggot-like, naked, soft, translucent. PUPA in rolled leaf, under a fine net.

Botys molusalis, Walk.—LARVA maggot-like, naked, soft, translucent. PUPA in rolled leaf; no COCOON or net; fastened by caudal ligature.

NYMPHALIDÆ.

EUPLEINÆ.

Limnas Chrysippus, Linn.

Mhow, August 30th, 1879.

Larva found feeding on the leaves of a shrub with fleshy leaves, exuding quantities of a milky juice on being torn, and with a compound purple flower, called by the natives "Ankra." The larva is furnished with six long, fleshy, smooth arms. Legs 6, 8, 2. Colour and markings shown in figure.*

During September I procured several specimens, but failed to rear a single imago; some specimens dying, others being the prey of a large dipterous parasite like a blue-bottle fly.

Oct. 5th. Got two more larvæ. One changed into a chrysalis the same evening or during the night. Suspended by anal extremity only. Of a fleshy ground colour, with a medial brown and gold stripe, and gold puncta about head and thorax.

Oct. 22nd. One of the specimens last noted became an imago this morning.

A common butterfly about here.

* It not being possible to reproduce all Mr. Forsayeth's numerous figures, a selection of the most important has been made by Messrs. Butler and Moore.—E. A. F.

Tirumala Limniace, Cramer.

Mhow, September 12th, 1881.

Found the larvæ on a species of creeper or vine with a stout woody stem and greenish yellow bark; leaves broad, smooth, and pointed at extremity. This vine grew close to a tree in my garden, and clung to its branches. All the specimens I bred were obtained from this one plant.

An outline sketch of the larva is given, showing the four smooth black fleshy "horns," two anteriorly and two posteriorly. The colour of the body is a pale yellowish green, ribbed with black transverse lines. Black markings exist on head, as shown in figure to the left of larva.

The larvæ possess no irritating powers; they curl up and simulate death for some moments when handled. A fine web attaches them by the prolegs to the leaf on which they are at the time feeding; this peculiarity they possess in common with the larva of *Papilio Erithonius*.

The pupæ are attached by the tail only; at first of a green colour, but in a day or two numerous patches of gold of the most brilliant lustre appear on the body and head, and a crescentic line of dots in the situation marked "a" in sketch.

The imagines appeared from Sept. 26th to Oct. 20th from two different broods of larvæ found on the same plant. Of these two were females and five males. The latter possess a curious pouch on the under side of posterior wings a little below their centre. It opens from the upper side of the wing, and contains a fine granular powder-like plumbago, quite inodorous. Front pair of legs rudimentary in both sexes. The males also possess a dense tuft of long yellow hairs like a brush, at each side of last segment of abdomen, but underneath the cuticle. I never saw them protruded, and am unacquainted with their use.

The species did not seem to me a common one in the locality, and I met with but few others than those frequenting the above noted plant in my garden. Their flight or habits present nothing noteworthy. They are not very strong on the wing.

SATYRINÆ.

Melanitis Ismene, Cramer. (Pl. XIV., figs. 2—2 b).

Mhow, October, 1879.

Got the larva from a native. It feeds on grass. In a few days it became a pupa.

Sept. 16th, 1881. Found a specimen of above larva to-day. Legs 6, 8, 2. Front aspect of head figured at Pl. XIV., fig. 2 a.

Sept. 17th. Found a chrysalis of this species on a grass stem.

Sept. 21st to Oct. 7th. Found several of these larvæ on a species of large grass growing in clumps of about four feet in height; leaf broad, long, and lanceolate.

Oct. 22nd. Three imagines out to-day. Front legs extremely small and delicate, would hardly be noticed on a casual inspection. Basal and terminal joints of palpi very small; middle large and curved. Club of antennæ very slender and graduated to a point. The wavy shading of brown on under surface of wings is much deeper in some specimens than others; the former are also the larger, and markings underneath are somewhat different. Posterior costæ of wings scalloped.

Oct. 23rd. Another imago out to-day.

Oct. 24th. I saw some of these flying near dusk after sunset in grass jungle when no other butterfly was to be seen, or had been visible for more than an hour previously. The flight is rather jerky, and movements curiously furtive; the insect perching with wings in erect position, thus resembling a dry leaf, and being very difficult to detect amongst bushes, &c., in consequence. It is evidently well aware of this, as, when pursued, it invariably makes a short flight and then settles suddenly, thus hoping to elude capture, in which ruse it is frequently successful.

Larva and pupa figured on Plate XIV., figs. 2, 2 b).

NYMPHALINÆ.

Junonia Orithyia, Linn.

Mhow, August 27th, 1881.

Larva found on a small labiate herb in a field close to my house. Head and body of a very dark shining black, shading into brown when seen by reflected light. Head on a short neck, latter of an orange colour for a short

distance; caudal extremity also tipped with orange. Body covered with perpendicular spines armed with strong radial hairs, which, however, have no irritating effect on the human skin. Head bifurcated; reddish spot in centre of face; a small spinous process on each upper angle of eye. Legs 6, 8, 2.

Pupa suspended by tail; naked; wing-covers of a muddy yellow; rest of body of a purplish colour, variegated by lines of a dull creamy white. Slight projections of an angular nature along abdomen.

A pupa formed on August 30th became an imago on September 7th.

Junonia Œnone, Linn.

Mhow, October 1st, 1881.

About this date and the end of September I found several larvæ precisely similar to those described above as of *Junonia Orithyia*, but without the orange tip on tail. They formed a pupa also identical in shape and markings. The larvæ were found on a different herb to those of *J. Orithyia*. The imagines proved to be quite distinct in colour and markings, though if brown was substituted for the azure-blue ground of *Orithyia*, their general appearance would be very similar. At the time I made no examination as to sex, and was under the impression that the present species was closely connected with, or a different brood of, that described above as *J. Orithyia*.

Precis Lemonias, Linn.

Early in October, 1881, I found a larva on same plant as that on which I found the specimens of August 27th (*Junonia Orithyia*). It has the orange neck and also a slight orange patch of same colour above anal legs, and seems identical with larvæ of *J. Orithyia*. Pupa also identical in appearance. On October 21st the imago came out, and I noted at the time, on cursory examination, that it was the same as *J. Orithyia*, except that under surface of secondaries had a reddish tinge, and were without ocelli underneath.

With regard to the three species last described, viz., *J. Orithyia*, *J. Œnone*, and *Precis Lemonias*, I am not aware if the larva of each has been separately bred and described. If such has been done, the error which

I have made will be apparent. Personally I must express my disbelief that the larvæ of the three species can be so similar as to be mistaken one for the other. Mr. A. G. Butler informs me that Horsfield and Thwaites "bred all three," but he does not say if the larvæ have been figured or described, and if they are so very similar as stated in my notes.

Hypolimnas avia, Fabr.

Mhow, October 9th, 1881.

Larva found on a small herb with a purple flower. I could not ascertain the name.

The larva somewhat resembles that of *Junonia Orithyia*, but the head is entire, of a red colour, and armed with two fleshy horns covered with short spines. The body is also armed with similar processes. Though the imagines are numerous in this locality I have only come across a single larva.

The pupa also resembles that of *J. Orithyia* in form and colouring, but of course much larger in size. It is suspended by the tail only, and has spinous projections along the centre of abdomen and dorsum of the thorax.

A favourite haunt of the imagines is fields of the yellow-flowered *Rameli*, but I have never found a larva on this plant.

Symphædra thyelia, Fabr. (Pl. XIV., figs. 3, 3 a).

Mhow, November 5th, 1879.

Larva brought by a native, who stated that it fed on the "Tendu" tree, a large tree somewhat resembling the ash. General colour a light grass-green; a row of purple spots along centre of back. Margin of body armed with long, horizontal, fleshy processes, covered with fine green hairs of a non-irritating character. Legs 6, 8, 2. Movements regular.

Nov. 12th. Changed to a chrysalis last night. Green colour; angular, with dark and gold spots and lines. Suspended head downwards; no thoracic band.

Subsequently, in November, I obtained several more larvæ and pupæ, and on Dec. 1st I note that "another larva has become a pupa during the night."

Jan. 6th, 1880. "Imago of last noted specimen came out this afternoon. The chrysalis was not kept in the sun or exposed to its influence."

The larva is shown, poorly figured, at Pl. XIV., fig. 3; the pupa suspended from twig at fig. 3 a.

PAPILIONIDÆ.

PIERINÆ.

Terias Æsiope, Mén. (Pl. XIV., figs. 1, 1 a).

Mhow, October 5th, 1881.

Found the larva on the leaves of a seedling of a species of yellow-flowered leguminous tree, with a flower like broom. The larva being small, and exactly similar in colour to the leaf on which it feeds, is by no means easy of detection. It is vermiform in shape, green with a lateral white line on either side. Legs 6, 8, 2. Movements regular.

Pupa attached by tail, and by a thoracic sling, in the horizontal position. Wing-cases shaped like a keel; head prolonged into a point. Colour at first green; afterwards turns a dingy brownish green colour.

Imagines emerged on October 14th, but I cannot say how long the pupal stage lasted, not having precise notes on this point.

The species is tolerably common in the locality, generally flying low over green herbage in gardens and cultivated ground.

Larva and pupa figured on Plate XIV., figs. 1, 1 a.

Delias eucharis, Drury.

Mhow, Nov. 22nd, 1881.

I am not certain of the food-plant of the larva, having found only one, and that was fastened up, just about to change to pupa. The chrysalides are, however, generally found on leaves of *Butea frondosa*. They have also been found on Mahwa.

The pupæ are fastened by a thoracic brace and a caudal ligature to the under side of leaves. They are of two colours, one as shown in figure; the other with similar markings, but of a deep glazed brown on the bodies, and with wing-cases of a light shade of dull sap-green.

PAPILIONINÆ.

Papilio Erithonius, Linn.

Mhow, September 17th, 1881.

I first found this curious larva on a species of orange or sweet lime tree, a large shrub with green fleshy leaves and thorny branches, common in Indian fruit gardens. Subsequently I found them on a small green herb, growing in grassy patches amongst cultivated fields.

General colour of larva a soft velvet-like grass-green. A white line runs along either side just above the legs. The abdomen is of a greenish white colour. Legs 6, 8, 2. Two small fleshy acuminate tubercles on the upper side of terminal segment, and also on the hood-like first segment. Between these latter, on pressure between finger and thumb, a double horn, soft and erectile, of a pink colour, shoots out and quivers slightly. These processes are not perceptible when the larva is at rest; they seem to be propelled outwards as a snail extends its tentacles; they are rather yellowish at the base and reddish towards extremities. When extrusion takes place a rather pungent, aromatic, but certainly not disagreeable, odour is given out. The larvæ seldom shoot forth these processes on being handled or irritated, but only on pressure being made. When the apparatus is withdrawn no trace of an aperture is perceptible.

The first segment forms a species of hood, partly concealing the head. On the dorsum are two crescentic patches, consisting of rows of ocelli. The young larva differs greatly from the mature caterpillar, having numerous processes, armed with stiff hairs or spines, along either side and head, and being of a totally distinct colour.

The larvæ appear invariably to attach themselves to the leaf on which they are feeding by a fine, almost invisible, web. On removing a larva from the leaf the web is dragged away by the feet, and then is easily seen. I have also noticed that they devour their exuviae, at least I never could find a cast skin in the cages in which I bred the larvæ from early youth to maturity.

When about to change its condition the larva attaches itself to a leaf by the anal feet, and supports the thorax by a strong silken band, the dorsum invariably being inferior, and the position that of a person reclining

supine in a hammock; this is shown in the sketch above noted, taken from life.

The pupæ are of two colours, green and brown, but identical in form; the green specimens predominated in those I bred, in the ratio of five to three. I am unable to say if these colours of the pupæ denote different sexes in the imagines, but think it probable. It is certainly not due to food, the larvæ of both being fed on the same shrub.

A pupa of the morning of September 12th became an imago at 11 a.m. on September 27th. I bred eight specimens; on September 17th all had changed to pupæ, and early in October to imagines; but I have not the precise dates. None of the larvæ were infested with ichneumons. The imagines are tolerably common in Mhow, and are generally seen in gardens or amongst cultivated fields. They fly at an ordinary pace and are not difficult to capture.

HESPERIIDÆ.

Pamphila Mathias, Fabr.

Mhow, August 27th, 1881.

Larva found on long coarse green meadow grass. Head triangular, on a neck; a brown line along the margin of head. Body grass-green, with light yellow bars across back. A whitish line along either side above the origin of legs. Legs 6, 8, 2.

Sept. 3rd. Two larvæ have become pupæ; they lie along a blade of grass, attached by a band across thorax, and also at tail. Head generally points upwards. Body of a translucent green colour, quite naked and unenclosed in a covering of any description.

Sept. 13th. Both pupæ have become imagines to-day. They are a species of *Hesperiidæ* very common about here, flying briskly by day, and settling on leaves of trees at dusk.

Oct. 9th. Another imago out to-day; same history as above.

Pyrgus Galba, Fabr.

Mhow, Sept. 15th, 1881.

Larva found on a small herb, in a rolled leaf. General colour green, finely striated transversely. Head dark brown, covered with short hairs. Neck marked with

orange and black, and sprinkled with small white dots. Legs 6, 8, 2.

The larva lies inside a roll formed by a single leaf turned over on itself. The posterior part of the body was incurved as if it was about to assume the pupal condition. When taken out of its habitation and placed on a fresh leaf the larva soon forms another residence by drawing over the edge of the leaf towards the centre by means of silk ligatures, in the usual manner of leaf-rollers.

Pupa situated in a leafy case, made by binding leaves together with a slight silken web, after the manner of some Noctuæ; it also has the remarkable greenish white efflorescence on its surface, which I have hitherto observed as a peculiarity characteristic, with few exceptions, of the arboreal Noctuæ—i. e., those species which make a cocoon of leaves and silk on or above ground on herbs, shrubs, &c.

The pupa attached in cocoon by spine at tail.

Oct. 8th. Imago out to-day. Upper wings very dark green, with white or very pale yellow markings; under surface yellow, with faint brownish markings.

SPHINGIDÆ.

CHÆROCAMPINÆ.

Chærocampa celerio, Linn.

Mhow, July 23rd, 1881.

I have observed two rather distinct varieties of this larva. The first were brought to me on above date. General colour green; telescopic neck. Two ocelli on each side of thorax. The anterior consisting of a yellow ring, enclosing a green disc, on which are five or six dark-coloured puncta. The posterior on next segment is a plain yellow disc.

The second variety I obtained on Sept. 15th. General colour brown, lighter on sides; a dark broad patch of the same colour runs along the dorsum. On the borders of this patch is a stripe of very pale lilac, marked with short black horizontal lines. Small yellow puncta are scattered along the sides above origins of legs. Spiracles yellow. Large ocellus on 4th segment, consists of a deep blue-black ring enclosing a yellow field, in the centre of which is a patch of deep brown with five blue puncta in it. The smaller ocellus on next segment is

formed by a yellow disc, margined by a deep blue band. Horn on last segment black at apex, graduating into a reddish tint at base.

Both varieties were identical in shape, fed on the same herbs—a common balsam, and another plant with large palmate leaf, of which I do not know the name. The pupæ and imagines also proved to be similar. I bred several of both in separate cages.

The larvæ bind dead leaves, bits of earth, &c., with silken ligatures, loosely together on the surface of the ground; under these they change to pupæ. The latter have a curiously keel-shaped head, spine at anus, and metallic markings on a pearly ground, something like that seen in papier-maché work. This pearly sheen is best developed on the front aspect of the wing-covers.

The imagines on and after issuing from the cocoons discharge a quantity of brown watery fluid from the anus.

I bred several imagines from July to October. I have notes only of the periods of four, *viz.* :—

Formed cocoon.	Became pupæ.	Imagines.
1. July 24th.	July 28th.	Aug. 13th.
2. Ditto.	Ditto.	Ditto.
3. July 26th.	?	Aug. 16th.
4. Aug. 30th.	?	Sept. 21st.

Chærocampa thyelia, Linn.

Mhow, Sept. 26th, 1881.

The larva, of which I have found only a single specimen, I got wandering in my verandah; probably it feeds on the convolvulus often called “railway creeper” in India. Ground colour a rich grassy green. The head and front segments are retractile; last segment armed with a short spine. The lateral margins of the body are ornamented with ocelli, seven in number on each side. The anterior ocellus consists of a pale pink circle, surrounding an area of blue, in which are small white puncta. The remaining ocelli have the pink margin enclosing a semicircular patch of brown, without puncta.

The pupa is keel-headed, resembling those of *C. celerio* and *C. Oldenlandiæ* in shape and colouring. The larva undergoes its change in a cell made on the surface of the ground under leaves.

Chærocampa Oldenlandiæ, Fabr.

Mhow, July 23rd, 1879.

Found the larva on a species of balsam common in gardens here. They are also found on a plant which grows in damp shady places, with a large palmate 7-divided leaf on a fleshy stem springing from a rhizome. Fruit, soft berries, sessile round stem. The larva has sometimes a green instead of a purplish ground colour.

The larvæ make cocoons on the surface, or partly below ground. One specimen I noted proceeded as follows:—"The larva has made a depression in the earth at one corner of the cage, and has pulled a leaf of the plant on which it was feeding down over it, fastening it with silk, a net of which material loosely woven forms the roof of the cell. On the portion of the net not protected by the leaf are mounted small lumps of earth so as to completely hide the larva underneath. It must have placed these lumps in position after forming the net by pushing them through the interstices from within, as when I first noticed it the larva was inside, and only a few scattered lumps on the outside of the net; afterwards I found the net quite covered with earth, yet the larva could not have emerged, the network being too closely woven."

The pupa is very similar to that of *Chærocampa celerio*, but the peculiar pearly markings are deficient or very dull.

The periods of some larvæ are shown as follows:—

Larva went into cell.	Pupa formed.	Imago came out.
1. July 27th.	July 30th ?	Night of Aug. 12th.
2. „ 28th.	„ 30th.	Morn of Aug. 16th.
3. Aug. 2nd.	Aug. 5th.	Morn of Aug. 25th.
4. „ 2nd.	„ 5th.	? (probably same time).
5. „ 22nd.	Devoured by dipterous parasites like "oak-flies."	
6. „ 22nd.		
7. „ 25th.	?	Sept. 16th.

Daphnis nerii, Linn.

Mhow, July 24th, 1879.

Larva found on a species of oleander indigenous here. I also found it on a shrub with a rosaceous flower resembling the orange blossom. General ground colour

a light grass-green; a white line on each side, with minute white round spots on each segment except the last, and a single spot only on each side of second last segment. A beautiful large ocellus on 3rd segment at each side, with deep blue margin, shading into turquoise towards a pale blue centre. The spine on last segment yellow ochre-colour, of a soft structure, and curving downwards and backwards. Legs 6, 8, 2.

July 26th. A larva about to become pupa. Previous to change they become of a dull sap-green colour, belly ochre, losing all their characteristic markings. Cocoon made on or partly beneath surface of earth out of particles of clay and fine sand held together by strong silk.

Aug. 13th. Pupa of July 26th became an imago this evening. I bred other imagines as late as January in the succeeding year.

Aug. 3rd, 1881. A larva formed cocoon this evening; the imago came out on August 24th.

SPHINGINÆ.

Protoparce orientalis, Butler.

Mhow, August 27th, 1879.

This larva feeds on a species of convolvulus which commonly ornaments the trellis-work of verandahs in Indian houses and at railway stations; hence vulgarly known to Europeans as "railway creeper." The larva is abundant wherever this plant is growing; ground colour a grassy green; a strong and large "horn" on last segment of a yellow colour. The spiracles are generally surrounded by coloured margins, varying in different specimens. In some I noted the outer circle was dark brown, surrounding an inner one of yellow, inside which was a red field. In others only the first spot presented three colours; the remainder were merely brown at centre and yellow outside. The semi-horizontal lines above the spiracles are sometimes dark brown with white underneath, or simply greenish white lines only.

One of these larvæ was infested by two thread-worms resembling some species of *Trilaria*, about as thick as fine sewing-cotton, and attaining a length of four inches. One I found on the larva when captured, the second a day or two afterwards in the cage in which the same

larva was confined. I presume they inhabited the larval intestine; or possibly, like the *Dracunculus* in the human subject, the muscular tissues. This is the only case in which I have observed such an occurrence.

The larva, when about to change, burrows to some depth below the surface of the ground, forming an oval cell, the walls of which harden so that it can be dug up intact, and inside which it becomes a pupa. No silk of any kind is used in forming the cocoon or cell.

The pupa is provided with a separate sheath for the long maxillæ, as shown in the figure; it is of a reddish chestnut-brown colour. Immediately after casting the larval exuvium the pupa is of a translucent green colour; after a time the envelope hardens, and turns to a bright chestnut tint.

I bred numbers of the larvæ from July to September. They appeared to me to be about the commonest species of *Sphinx* found in the vicinity, and are reared without difficulty.

ACHERONTIINÆ.

Acherontia Styx, Westw.

Mhow, October 5th, 1881.

Of two larvæ figured by me, I have some doubt as to which is the larva of *A. Styx*, as will be seen from the history detailed below.

On above date I got several of both these larvæ in abundance in one field of "Tilli" (? jessamine). In the whole country I found them in only this one situation. That they were two distinct species of larvæ I am certain, having observed specimens in various stages of growth. They burrowed under ground, forming cells of earth of an oval shape, in which they changed to pupæ; similar in all particulars to that figured. The two species of larvæ were bred in separate cages, and, on comparing the pupæ of each with the other, I could detect no difference. Before the imagines could come out I had to pack up my specimens *en route* for England, and did not keep the cocoons and pupæ of each species distinct.

On arrival in England I was unable to unpack my cases until early in September. I then found three imagines dead after emerging from pupa-cases. Other pupæ were devoured by parasites, and two were crippled in emerging, being probably killed by shocks to the box in which they were packed. All the imagines, so far as

examined by me, appeared to be the same, but, owing to their imperfect condition, this may admit of doubt (?).

That the larvæ were different I cannot doubt, and, as Mr. A. G. Butler informs me that there are two species of Indian "death's-heads," I believe the two larvæ in question represent those two species. It is, of course, possible that all the pupæ of one larva died, and the imagines found represented only one species; but this is not probable, as I had about the same number of pupæ in each case.

Curiously, in an old note-book dated Nasirabad, August 20th, 1877, I find that I there bred several "death's-heads" from "large green caterpillars of some *Sphinx*"; and further, "When the moths are touched they raise the wings, and move the abdomen up and down, making a creaking noise, and ejecting an orange-coloured fluid from the anus. The abdomen seems to contract and expand when the insect makes the above sound."

SMERINTHINÆ.

Clanis cervina, Walk. (Pl. XV., figs. 1, 2).

Mhow, August 25th, 1881.

This larva feeds on the leaves of "Palas," *Butea frondosa*. I have always found it on the small bushes, not on the trees, and only in this one situation. The shape of the young larva differs somewhat from that of the full-grown one, as will be evident from inspection of the figures. The shape of the head especially is very distinct; also the size and shape of caudal spine. General colour a grass-green; white lines along the sides. Small yellow puncta on the enormous head.

I had the greatest difficulty in rearing these larvæ, and, although I procured numerous specimens, yet I was singularly unfortunate. In the first place I found it almost impossible to preserve the "Palas" leaves fresh for even an hour or two in the cages, either the twigs in water or in damp earth. Then the larvæ, after reaching maturity, either died without any apparent cause, or developed parasites, or rotted in the cocoons after becoming pupæ, or even before they had changed. Finally, when by dint of perseverance I had got a few larvæ to all appearance safely under ground, I got orders for home, and had to pack up all specimens as I best could for the journey. These four larvæ retired under ground

in October; on March 3rd following I opened the cells of earth carefully and found them still unchanged. I next examined them in England on August 28th, 1882, and found two larvæ dead, unchanged, one dead pupa, and the third changed to an imago,—dead, of course,—and wings rather undeveloped owing to want of room to expand while packed up in cotton wadding.

The pupa is of the ordinary form of the order, without detached maxilla-case (Pl. XV., fig. 2). The larva, young specimen (Pl. XV., fig. 1 *a*), front of head (fig. 1 *b*). The mature larva (Pl. XV., fig. 1).

Amongst the numerous larvæ which I have bred not one gave me a tithe of the difficulty which I encountered with this species. They seemed to die on every possible opportunity, such as changing skin, &c., and I frequently despaired of ever obtaining a pupa. Possibly the best chance of obtaining perfect specimens would be by digging, in the winter months, under the "Palas" bushes; but the wild boar and bears generally anticipate one in endeavours of this kind after "grubs."

Clanis Deucalion?, Walk.

Mhow, July 9th, 1879.

Found a large larva of some *Sphinx* wandering amongst grass. General ground colour light yellowish green. White lines running at a slight angle from dorsum to edge of abdomen. A short blunt horn on dorsum at caudal end. Buried itself the same day at noon.

Took it out of earth on July 21st. The pupa was made in a large oval earthen cell below surface of ground. Imago came out the night of August 7th or morning of the 8th. By the great size of the abdomen it would seem to be a female.

This specimen possessed the most extraordinary vitality. It recovered four times from poisoning by chloroform after apparent death on each occasion; it also recovered after being twelve hours in a cyanide bottle. The same thing occurred after chloroform and twelve hours in a box with camphor. Finally I had to inject chloroform into abdomen, pinch the thorax, and leave it over cyanide all night. This eventually killed it.

Figure (outline) of larva, the only specimen I have met with. Figure of pupa and imago on page 1, sketch-

book No. 6. The specimen itself was destroyed by mites or lost, I forget which.

Polyptychus dentatus, Cramer.

Mhow, September 3rd, 1879.

These large larvæ are found on leaves of the "Lasora" or "Gondi," a tree of considerable size, something like the English oak. General ground colour a fine rich green with puncta, as shown in the figure, which was taken from a larva about to change, and presenting a pinky brown ground colour instead of the green normal tint noted above. They are easily reared and pretty abundant, but I have never caught any wild imagines.

The above specimen, with two others, burrowed under ground same day. On Sept. 6th I dug it up, and found the larva shrivelled in size inside a cell of earth of an oval shape; the colour now of a dull greenish brown. It remained unchanged until Sept. 8th, when I note "that it changed to pupa during the night or early this morning," "larva-skin quite moist and fresh." The pupa was of a fine chestnut-brown, and shape as figured.

Sept. 22nd. First imago out to-day. General ground colour of body and wings a bistre-brown. Thorax peppered with white; wave-like markings on wings of a deep velvety brown tint; body mouse-coloured; legs naked, creamy white; under wings plain brown colour; body very large. They simulate death when touched, falling down and contracting their limbs, and will remain in any posture in which they may be placed for an indefinite length of time.

ARCTIIDÆ.

Alope ricini, Linn.

Mhow, August 17th, 1881.

I have always found this larva on a climbing convolvulus with purplish flowers, commonly grown on verandahs here.

Head of a deep black colour; body very dark brown; a brown line down centre of back with a yellow margin on each side; a similar but fainter line along each side of body, interrupted at junctions of segments. Body thickly covered with tufts of brown hairs in whorls, tipped with dirty white.

The cocoon is frequently made in the form of a horizontal hammock (but sometimes vertical), spun of fine silk, in which the hairs of the body are interwoven; a dark spot generally marks each end of hammock. Pupa slightly adherent by caudal end to hammock.

The larva figured I found on September 5th, 1881, and describe it as somewhat like that of *Alope ricini*, but stripe down back of a muddy yellow; an irregular line of dirty white along sides; head black, upper lip and palpi white. General colour of body a light brown; without hair, except small scattered filaments on back and on sides above the legs.

On Sept. 7th I record that "To my astonishment, on looking at this larva to-day, I find it covered with hair. On searching the cage I found the mystery explained by a cast skin. It is the *Alope ricini*; curious its casting all the hairs first, so many days before it threw off the skin."

Those larvæ noted spun cocoons as follows:—July 29th, August 22nd, August 26th; imagines came out August 13th, September 7th, September 12th.

Cretonotus interruptus, Linn.

Mhow, November 2nd, 1881.

Small hairy larva; Indian ink-brown colour; whitish yellow line along back; similar marks along lateral margins; whorls of hair on each segment; head slightly divided between eyes on vertex. No notes of pupa.

Arcas laticinea, Cramer.

Mhow, September 20th, 1881.

Larva found on a shrub with fleshy stem and leaves, from which a milky juice exudes on fracture, called "Ankra" by the natives. Body clothed with tufts of long shining black hair in whorls. In the earlier stages the larvæ have a light reddish brown patch on the dorsum; they afterwards become a deep shining black all over, but in reflected light a brown shade appears about the base of the hairs. They are very active in their movements. The hairs do not seem to irritate or penetrate the human skin when the larva is handled.

Cocoons made of silk with earthy particles adhering, on and partly under the surface of the ground.

LITHOSIIDÆ.

Lacides ficus, Fabr.

Mhow, September 7th, 1881.

Larva found on the leaves of "Piple," "Pakar," or "Pakal," a species of *Ficus* somewhat like *F. religiosa*, but without the long attenuated apex of the leaf of the latter. The larvæ are also found on the leaves of *F. religiosa*. Head shining black; body dark velvety brown, dotted with red papillæ, from which issue weak white hairs. A bright yellow patch exists on lateral margin of segment between pectoral and ventral legs; a similar patch also between last ventral and anal legs; pads on ventral and anal legs are very large. Legs 6, 8, 2. The colouring of the larvæ varies in different stages of growth, the younger larvæ having yellow markings along back and orange on neck.

Pupa armed with five or six small spines at apex. Colour rich glossy chestnut. Cocoon in one instance was made on surface of earth, but as a rule they are made under the surface; composed of silk, into meshes of which earth is woven.

The imagines are active, and equally endowed with powers of flight. The male has bipennate antennæ, female filiform. The larvæ are easily bred and tolerably abundant.

LIMACODIDÆ.

Miresa albipuncta, H.-S. (Pl. XIV., fig. 8—8 c).

Mhow, August 2nd, 1879.

The larva is found plentifully on the leaves of "Palas" shrubs (*Butea frondosa*); most abundantly on the fresh growth which springs up from stumps cut away the previous season. It is quite conspicuous on the upper sides of the leaves, and makes no attempt whatever to conceal itself or elude observation. On being handled a stinging pain is felt, and an irritable rash produced on the part touched, similar to that caused by nettles. The pain lasts for about ten minutes, with considerable itching, but leaves no ultimate ill effect. The larvæ are very sluggish, and do not attempt to escape when handled. On being touched by the hand or by another insect they move the head from side to side as if endeavouring to sting the assailant with their hairs.

The pectoral legs are very small. There are one pair of prolegs apparently on each segment posterior to the pectoral legs; the anal legs are not well marked. The prolegs are membranous and very difficult to distinguish, the movements being snail-like or vermiform, by waves. The head is under a hood formed by the 1st segment, and is not visible even when the larva is feeding; it can, however, be protruded voluntarily by the larva.

The pupa is formed in a small oval, very dense, shell-like cocoon (Pl. XIV., fig. 8 c) near surface of ground, or on under side of leaves in some few instances. Those made in confinement were always attached by base to wooden floor of the cage, and covered over with sand or earth from one to two inches in depth. The shape of the pupa is peculiar, the body being curved, and wing-cases extending almost to the extremity of the abdomen. (Pl. XIV., fig. 8 a).

The larva is figured at Pl. XIV., fig. 8, and one of the eight large dorsal spined arms magnified at fig. 8 b.

Aphendala tripartita, Moore. (Pl. XIV., fig. 14).

Mhow, August 16th, 1879.

Larva not common. Found on "Palas" (*Butea frondosa*), on date-palm, and on a shrub which I am unable to name. Habits similar to those of *M. albipuncta*. Head under a hood formed by 1st segment. The spines possess the property of irritating the human skin, and the movements and anatomical characteristics of prolegs are the same as in the species above mentioned. The largest larva I obtained was $1\frac{3}{8}$ in. long, nine chrome-yellow spiracles, and ten lilac spots along each side; the same number of spots along centre line of dorsum. There are four rows of fleshy spines, armed with poisonous hairs on dorsum and lateral margins. Stinging powers severe. The membranous prolegs are best seen when the larva is forced to crawl along an edge, such as that of a card or a paper-knife; the prolegs are then tolerably defined as they grasp the edge at each side to keep the larva from toppling over.

The cocoons are similar to those of *Miresa albipuncta*, and are made under the surface of the ground. The larvæ are infested by a large dipterous parasite somewhat like, but larger than, the common house-fly.

Larva figured at Plate XIV., fig. 14.

Parasa lepida, Cramer.

Mhow, November 24th, 1879.

The larva, which is tolerably common, feeds on the leaves of the well-known mango-tree of India.

The description given of *Miresa albipuncta* applies to this species so far as concerns the legs; pectoral legs six. Prolegs merely membranous folds, so indistinguishable one from another that I could not count them, or even see them, unless the larva was in motion, when they appeared as waves commencing at the thorax and ending at the anus, the mode of progression resembling that of a snail. A blue line runs down centre of dorsum, with a paler blue line along either side of body. At the posterior (anal) end of the lateral lines is a black tuft; two similar tufts exist at the anus. Two red tufts adorn the dorsum of thorax, also two on dorsum of second last segment; rows of green tufts also run along dorsum and lateral margins. Some of the spines in the inferior lateral line of tufts terminate in short white hairs, and have a small whitish process in the centre of the tuft.

The cocoons and pupæ resemble those of *M. albipuncta*, but are invariably made on the trunk or branches of the mango-tree, unconcealed in any way. The texture is very dense and hard, but brittle like an egg-shell. I have not noticed any stinging powers in the case of this larva.

LIPARIDÆ.

Psalis securis, Hübn.

Mhow, August 25th, 1881.

Larva found amongst long meadow grass, on which it feeds. Head dark brown; broad lemon-yellow band along each side of body. On dorsal surface of the central segments are four dense tufts of short deep brownish orange hairs; two head and one tail tuft of long dark brown or blackish hairs; other thinner tufts of hair of a whitish colour on each segment at sides of body. Front legs six, black; posterior eight, sienna-red; caudal two, ditto. Black velvet line down centre of back, bordered on either side by a yellow band of small oblong marks, varied by a bright orange mark on every fourth yellow patch.

Cocoon of silk, attached by greater length to stem of grass. An opening defended by hairs exists at inferior extremity for egress of imago. Head of pupa towards this aperture.

From a cocoon spun on Sept. 1st an imago came out on night of Sept. 11th. It occupied, when at rest, the position shown in the sketch, the front legs stretched out in advance of the head, and was sluggish and not easily excited to move during the day.

Parasitic on this larva is a large yellow-bodied insect like a sawfly, with long antennæ, which are perpetually in a state of tremulous motion. A single parasite occupies a whole pupa.

Euproctis lunata, Walk. (Pl. XIV., figs. 5—5 c).

Mhow, September 23rd, 1879.

The eggs, covered with down from the abdomen of the female, are deposited in oblong masses on the twigs of *Acacia Gummi-arabica* and allied species (Pl. XIV., fig. 5 a). The larvæ feed on leaves of above tree, also on *Zizyphus jujuba* and garden rose.

The larvæ hatched from a mass of eggs on Sept. 23rd, changed skin for the first time on Sept. 27th, again on Oct. 6th, and a third time on 15th to 18th of October. I noticed that all the larvæ were not the same size. On Oct. 29th some had begun to spin cocoons of a loose web-like character, singly and gregariously in the corners of the cage. Nov. 5th: Most of the larvæ had spun cocoons on this date, and by Nov. 11th almost every one had done so. The cocoons are soft silken bags formed under surface of earth, but close to it, and with particles of clay adherent to them.

Pupæ with small caudal spine. Male smaller than female, and distinguished by its larger antenna-cases.

The imagines, when touched, fall down and simulate death. General colour white, with black oblong patch at centre of primaries.

Male smaller than female, with large doubly-plumed antennæ. In the female the antennæ are smaller, but otherwise resemble those of male. The extremity of female abdomen is also furnished with a large mass of silky down, absent in the male, and used to clothe the egg-masses after deposit on twigs of the food-plant. In the female the mouth is rudimentary; I could find no

trace of maxillæ. The labial palpi were 3-jointed, middle largest, terminal very small. The legs were feathered. No spines on anterior tibiæ; two spines at extremity of middle tibiæ; two spines at centre, and also at extremity of the posterior tibiæ. In the male, mouth and legs same as in female, except that the anterior tibiæ are furnished with a thick tuft of hair, in which is concealed a strong, jointed, ensiform spine.

Larva and male and female pupa figured at Pl. XIV., figs. 5, 5 *b*, 5 *c*.

Nioda fusiformis, Walk. (Pl. XV., figs. 5—5*f*).

Mhow, September 6th, 1881.

Found two of these curious larvæ on a Babul (*Acacia* sp.) tree. Legs 6, 8, 2. General ground colour bluish grey. A double line of red dots (tubercula) studded with hairs exist along each side of body. On the dorsum a broad black line runs from the brush-like thoracic plumes to the base of the caudal plume. On the dorsal surface of the two segments immediately preceding the caudal plume are two tubercles of a red colour, and without hairs. The head is adorned by two long plumes of black hairs; a similar plume, but consisting of hairs of three different lengths, ornaments the last segment; the pennate extremities of these hairs are very singular and elegant. On each side of the thoracic segments is a short plume of similarly feathered black hairs, mixed with longer simple white hairs. On the dorsum of thorax and of 1st abdominal segment are four thick shaving-brush-like tufts of vertical short white hairs; the three thoracic are separated by a short interval from the fourth tuft.

Sept. 7th. Both larvæ spun small hammocks or cocoons of whitish silk mixed with the hairs off their bodies, and having an opening at one end for escape of the imago, similar to those of *Psalis securis*. The larva skin remains in cocoon at one end. Pupa: Front clear milky white colour; back marked with brown. It is attached by caudal point to cocoon. Very fine hairs sparsely scattered on body.

Sept. 16th. One imago out this morning. In posture and general appearance resembles *P. securis*.

Larva, details of hairs, and pupa (Pl. XV., figs. 5—5*f*).

Pseudomesa incerta, Walk.

Mhow, September 5th, 1881.

Larva found on the leaves of Pipal, Babul, and Ber trees. Colour light brown with creamy variegations and dark markings, as shown in figure; belly and lower margin of body of a greenish brown. Along dorsum a double row of tubercles exist armed with minute spines; sparse tufts of hair of simple character exist along lateral margins of segments. All the hairs and spines are simple, and possess no irritating properties.

The pupa is suspended back downwards in a hammock of very thin and openly-worked silk; it is attached to the net by caudal spine. A tuft of black hair exists on the head; hairs also along dorsum of thorax. The remainder of body is thinly clad with short white down. Colour a dull dark purply brown. The wing-covers appear short in proportion to remainder of body, especially in female pupæ, which are also much larger than the male.

The male imago is active, and with plumose antennæ and fully-developed wings. The female is much larger in size, with rudimentary wings, simple filiform antennæ, and an enormous abdomen clothed with very short light fawn-coloured hair. It is extremely sluggish in its movements, seldom even moving from one position for days. The females are extremely prolific, laying great numbers of eggs in semiglobular masses attached to leaves, &c., and covered with fine down torn from their bodies. They live for about a week, and then, having deposited all their eggs and stripped themselves bare of down, die, shrivelled, naked and atrophied objects—but the shadow of their former selves.

The larvæ vary in size; I have found some about one-third longer and three times as bulky as that figured. They are occasionally infested with a minute red tick-like parasite.

Perina nuda, Fabr. (Pl. XIV., figs. 7—7 b; Pl. XV., figs. 6 a—6 d).

Mhow, August 29th, 1881.

The larva feeds on the Gular (*Ficus* sp.), but I have also found it on the Pipal (*Ficus religiosa*). It is very

sparingly hirsute, having feeble white hairs along the lateral margins of body, also springing from the yellowish velvety tubercles on body, and from two of the red tubercles on head; the hairs do not irritate the human skin.

The pupæ bear a considerable resemblance to those of butterflies, suspending themselves by a few irregularly decussating fibres of silk on the under side of a leaf, and are uncovered by a net or cocoon of any description. The tension of the silken cords generally inverts to a slight degree the edge of the leaf, but not sufficiently to conceal the pupa when the leaf is viewed from below. The surface of the pupa next the leaf is of a pale yellowish white, but its outer surface is coloured with yellow, green, and brown.

The male imago is very active, clear-winged, and with large plumose antennæ. The female much larger, with white wings and body, very sluggish, and dull in disposition. The imagines do not seem common here; I have never captured them at light. The females are very inactive at all times, but the males attempt to escape from the breeding-cages even in the daylight, on the least disturbance being made; they are not, however, diurnal in their habits.

Ova, larva, and pupa figured on Pl. XIV., figs. 7, 7 *a*, 7 *b*.

Pl. XV., fig. 6 *b*, shows the posterior or medial leg of both sexes. Only two spines exist at extremity of tibia, none at its centre. Legs sparingly covered with hair.

Pl. XV., fig. 6 *c*. Anterior tibia of male, with hinged appendage fitting into hollow on one side.

Pl. XV., fig. 6 *a*. Palpus, magnified; the two basal joints largest; clothed with hair; joint between terminal and medial portions not well defined; basal joint about as long as the two others combined.

Pl. XV., fig. 6 *d*. Apex of male abdomen, with integument removed to expose internal organs.

The maxillæ are very slender, and about the length of the head. Palpi not conspicuous, somewhat recurved. Antennæ of the male broadly pennate; of the female also pennate, but much narrower than in the male.

Trisula variegata, Moore.

Mhow, August 28th, 1881.

The larva, of which I have only seen a single specimen, was stated to have been found on the leaves of a Pipal tree (*Ficus religiosa*). It was thick, fleshy, and "grub-like," of a dull sap-green colour, and the body scantily clothed with moderately long hairs.

The cocoon was made of sand and small stones firmly bound together with silk of very strong texture, in a corner of the cage, partly under the surface of the earthen or sandy layer in its bottom.

The pupa has a curved caudal spine, and is of a rich chestnut-colour. It did not appear to be fastened within the cocoon.

The imago came out on October 6th. I have not met with another specimen.

LASIOCAMPIDÆ.

Chilena strigula, Walk. (Pl. XIV., figs. 6—6 b).

Mhow, September 17th, 1881.

Larva found feeding on leaves of a small thorny bush, somewhat like *Acacia*. General colour black and yellow. Body adorned by tufts of hair on each segment, short along dorsum and margins, except one long tuft of black hairs tipped with white on terminal segment, and two similar tufts on 2nd and 3rd segments; other shorter hairs of an orange colour on body, as in figure. Legs 6, 8, 2.

Cocoon formed of strong silk attached by long axis to stem of shrub; inferior extremity arranged to open for extrusion of imago.

Pupa of a dark chestnut-brown colour, without spines; truncated at its caudal extremity.

Imagines came out about middle and end of October.

Figures of larva, pupa, and cocoon on Plate XIV., figs. 6, 6 a, 6 b.

Trabala Vishnu, Lefebvre.

Mhow, September 12th, 1881.

Larva feeds on the leaves of the pomegranate, rose, and probably other shrubs. It somewhat resembles in

general appearance that of *Lebeda Buddha*, but is without the peculiar bunch of short hairs on dorsum of thorax which exists in the latter species. General ground colour is that known as "old gold." The lateral tufts of hairs are also of the same colour, but the two head-plumes are black. Head pink, marked with yellow striæ; spots on back are blue and studded with scanty short black hairs; belly a yellowish green, marked with pink and brown bars transversely. Body elsewhere is covered with a smooth fleece of short golden fur. Legs 6, 8, 2, pink. It is one of the handsomest larvæ I have met with, and tolerably easily reared.

The cocoon is formed on a twig of the food-tree; spun of yellow silk intermixed with hairs of larva. It is firmly attached by silk and hair wound round the twig above and below the cocoon. The peculiar shape is shown in figure. An opening exists at inferior end of cocoon, through which the skin of the larva is extruded after the change to the pupa. In some cases I have noted that an opening in the form of a slit appeared to exist in each end of the cocoon.

The pupa is of a yellowish red colour, quite smooth and devoid of spines or hair, except at caudal end, where there is a tubercle armed with minute spines, to which silk is fastened in order to attach pupa inside the cocoon. The shape of the neck and thorax of pupa is remarkable.

The male imagines are green, with large pennate antennæ. The under wings are extended horizontally, and at an angle of about forty-five degrees from the centre line of the body when the insect is in repose. The upper wings remain in their usual situation, meeting along the internal costæ in central line of dorsum. This is shown in the figure of the male drawn during life.

The female is larger than the male, and of a yellow colour, so presents a great contrast to the opposite sex. A wild specimen, which I found dead near some recently-deposited eggs on a tree, was much larger than those which I bred from the larva in captivity. This was no doubt due to deficient food supply. The eggs of the female are attached to leaves, and covered with down and white hairs from the vicinity of the anus of the mother.

The younger larvæ have silver instead of gold-coloured

fur. The imagines are very sluggish, and are indisposed for flight during the day.

Megasoma venustum, Walk.

Mhow, August 27th, 1881.

Larvæ very common on leaves of Babul and Ber trees in Central India; they vary in their markings at various stages of growth, so that figures, unless all taken at the period of most complete development, will be found to differ considerably. The full-grown specimens are characterised by \asymp semi-lunar double markings on the dorsum, as in figure. At the ends of these markings minute red papillæ exist armed with spines, but having no irritating properties. At the anterior commissure of the semi-lunar markings a light blue spot exists. General colour of larva a greyish brown. Tufts of long simple hairs at lateral margins of segments, with shorter dilated hairs amongst their roots. Two peculiar transverse patches of short coloured hairs ornament the dorsum of the thorax. When the larva is irritated these patches open out from within, and display deep blue-brown hairs, with a line of reddish orange in front of each. When quiescent these patches are denoted by a mere line of blue, with red in front and white behind. Abdomen of larvæ black, with a yellowish-white spot on each segment.

I have found full-grown larvæ as above, but without the \asymp markings; these are very rare, and on being bred developed the same imagines as the other specimens.

The cocoon is hammock-shaped, formed on a twig of the *Acacia* tree, attached along whole length of one side, and is formed of strong whitish or brown silk. On its external surface are coloured bars, formed apparently by the attachment of the short hairs on the dorsum of the thorax of the larva. The cocoons are generally formed in a perpendicular position, the head of the pupa being upwards.

Pupa rather cylindrical in shape, clothed with fine hairs, of a brownish-red colour. Female much larger than male.

Imagines, both male and female, extremely sluggish by day, and even by night the female does not appear to move about. The wings of the female are occasionally

but partly developed, and I have bred specimens which did not leave the pupa-case, but remained attached to it by abdomen, filling it with eggs before having had intercourse with a male. The mouth appears rudimentary and useless. Wings large and extending beyond extremity of abdomen. On issuing from pupa-case the abdomen is full of perfectly-developed eggs with *hard* shells. Should the female be confined alone the eggs will be deposited, but will not produce larvæ; on admitting the male fertile eggs will be produced. But how does the seminal fluid penetrate the dense shells of the eggs and reach to the bottom of the mass of eggs contained in the ovaries? The whole abdomen of the female is simply a conglomerated mass of eggs, no room being required for digestive organs, as the imago never feeds from birth to death.

Seven-eighths of the larvæ I bred proved to be females. The male imago has wings much shorter than abdomen, but is capable of flight, is very sluggish, and simulates death when handled. When examined immediately after issuing from pupa-case the extremity of the abdomen is seen to be furnished with an easily detachable tuft of fine hair of a light brown colour, tipped with dark brown.

Lebeda Buddha, Lefebvre (Pl. XV., figs. 3—3 b).

Mhow, August 22nd, 1881.

The larva feeds on the leaves of the Mahwa tree, and bears a considerable resemblance in appearance and habits to that of *Megasoma venustum*, but the markings on the back are quite distinct, being irregularly oval velvety brown patches, containing four blue papillæ armed with long hairs. They never have the)((half-moon) marks so characteristic of *M. venustum*. General ground colour of larva dark grey. A narrow crimson line across dorsum of 2nd segment, behind a tuft of dense short hair; lateral margins clothed with tufts of long simple hairs of a whitish brown colour. Very few hairs with expanded extremities are to be seen, except in the dense dorsal tuft, and two or three in dots along the lateral margins. These larvæ are apparently much more rare than those of *M. venustum*, and I had difficulty in feeding them, as, strange to say, they obstinately

refused any leaves of Mahwa, except those of the identical tree on which they were found.

The pupa and cocoon are very similar to those of *M. venustum*, but the latter is not marked with cross-bars outside, or quite so hammock-like, and it is of thinner silk.

The male imagines have abdomen longer than wings, and a curious porcine aspect about head and thorax. The females resemble those of *M. venustum*, except in colouring. Both sexes rather more active than those of former species, but evidently very closely allied.

Figure of male imago, pupa, and larva (Pl. XV., figs. 3, 3 a, 3 b).

BOMBYCIDÆ.

Trilocha albicollis, Walk. (Pl. XV., figs. 10, 10 a).

Mhow, August 14th, 1881.

Larva feeds on the leaves of Pipal (*Ficus religiosa*). General ground colour a soft pale brownish grey, diversified with pale ochre-brown puncta and markings. A soft spine on dorsum at caudal end.

Cocoon of a cylindrical shape, attached by one side to leaf, and also secured by a web of loose silk netting above it; it is formed of yellow silk, and is of firm texture.

Pupa not particularly noted.

From a cocoon made on August 18th the imago came out on August 25th. Body and wings of a soft pale French grey. Antennæ plumose, hooked at the end. The wings are extended horizontally when at rest. The medial and posterior legs are without spines.

Figures of larva on a Pipal leaf and cocoon (Pl. XV., figs. 10, 10 a).

NOTODONTIDÆ.

CAREINÆ.

Dabarita subtilis, Walk. (Pl. XIV., figs. 4—4 b).

Mhow, October 15th, 1879.

The larvæ feed on the leaves of a tree called "Jaman" by the natives. They have a very peculiar appearance, owing to the large bladder-like expansion of the 1st segment of thorax. This appears capable of contraction and dilation at will; in the latter condition the head is almost concealed within it.

The cocoons are formed of strong yellow silk, of an

ovoid-oblong form, somewhat boat-shaped. Generally spun on the surface of a leaf.

Pupa smooth, and without spines at caudal end.

The imagines, both male and female, are active, and similar in general appearance. Antennæ long and fili-form. Maxillæ coiled, as long as thorax. Labial palpi recurved, 3-jointed; terminal smallest. Scales on body and wings very firmly attached, except under the thorax. The 1st joint of the posterior tarsi is of extraordinary size; it is clothed with fine hairs, which when removed display a covering of small scales; on removing these latter a strong brush of white hairs, arising at the inferior extremity of the tibia, are seen at "a."

I cannot conceive the utility of the curious brush described above, as it is so firmly bound down by the scaly integument into the hollow of the tarsal joint that, except through accident, I should hardly have discovered it. The 1st joint of the tarsus is hollowed out on one surface in order to allow the brush to lie in its concavity. I find no notes as to whether this is a sexual peculiarity. I have a note that the anterior tibiæ in a female were found to possess the hinged joint which was noted in the males, but I am not certain that this is always the case.

The larva and male and female pupa are figured on Plate XIV., figs. 4, 4 a, 4 b).

GLOTTULIDÆ.

Glottula dominica, Cramer.

Mhow, August 20th, 1879.

Larva feeds on the spongy interior of the large, acuminate, single, fleshy leaves, from one to two feet long, of a plant grown in gardens here, bearing a white flower on a compound branching stalk; I am ignorant of its name. The larva lives in concealment, mining in the inter-cellular tissue between the two surfaces of the leaf.

Pupa formed in a subterranean earthen cell. No white efflorescence on surface.

Imago (male ?) has two brushes at base of abdomen. Maxillæ very short.

The eggs are deposited on the surface of the leaf, in a spiral form, and are sparsely clad with short hairs.

APAMIIDÆ.

Prodenia retina, Guenée.

Mhow, September 4th, 1881.

Larva found on a purple-flowered climbing convolvulus (railway creeper). It has a curiously abrupt truncation of caudal extremity. General colour a pinky brown; pinkish line down centre of back. A double row of spots exists on each lateral margin; the superior row consists of triangular patches, black above, with a yellow line at base, except the third patch from the head, which is altogether black in colour. The two anterior patches have more yellow at base than any of the others. The inferior row of patches is wholly of a black velvet colour. Legs 6, 8, 2. Progression regular.

The larva buried itself under earth Sept. 4th, closing the hole by which it entered with a plug of damp clay. The cocoon is formed of a cell of earth some inches below surface.

Pupa a bright chestnut-colour, with two small spines at apex.

Imago came out on September 20th.

Perigia centralis, Walker; *Celæna serva*, Walker;
C. cano-rufa, Walker (Pl. XIV., fig. 11).

Mhow, October 12th, 1881.

The larvæ were obtained in great abundance, and in various stages of growth, on the leaves of Rameli, a plant cultivated for the sake of its oil in this locality (see Pl. XIV., fig. 11). The movements are almost semi-looping in character, yet the larva has sixteen legs.

I have not recorded the characteristics of cocoon and pupa, but I believe the change took place in small earthen cells below surface of the ground, and that the pupæ were of the usual chestnut-colour, without any white efflorescence on surface.

HELIOTHIDÆ.

Heliothis armiger, Hübn.

Mhow, October 1st, 1881.

Larva feeds on the flowers of *Zinnia elegans*, indigenous in this locality. It burrows into the centre of the mass of pistils, which it devours, going from flower to flower,

and not touching the leaves. There are darker varieties of the larva than that figured, but otherwise identical.

The pupa is formed in a cell of clay below the surface of the ground, similar to those made by some Noctuæ. Apparently no silk is used in its formation. The pupa is of a light yellowish chestnut-colour; body smooth; at the caudal end are two spines separated at base, and meeting at apices.

PLUSIIDÆ.

Plusia chrysitina, Martyn (Pl. XIV., figs. 13, 13 a).

Mhow, October 8th, 1881.

Larva found on a flowering cereal called "Rameli," grown in cultivated lands in this vicinity, and now in bloom. Owing to the colour of the larva it is very difficult to detect by the eye, but numbers are easily procurable by beating into an umbrella. Two front pairs of prolegs absent. Movements looping.

Pupa made in a delicate net of silk within a partially-rolled leaf. It is coloured as shown in figure (Pl. XIV., fig. 13 a), and has no white efflorescence.

The imago, of which I bred but one, has a crested thorax, and large golden patches on the upper surface of anterior wings.

Figure of larva on a stem of Rameli, also of pupa, Plate XIV., figs. 13, 13 a.

GONOPTERIDÆ.

Cosmophila indica, Guenée.

Mhow, October 4th, 1881.

Small larva found on Razal, a plant with an edible flower, in my garden. Semi-looping in progression.

Pupa contained in a cocoon in a partially-rolled leaf.

HOMOPTERIDÆ.

Homoptera solita, Walk. (Pl. XIV., fig. 9).

Mhow, October 7th, 1881.

Larva found on the leaves of seedlings of a leguminous tree. Movement looping. Two front pairs of ventral legs deficient; remainder normal (Pl. XIV., fig. 9).

Pupa made in a leafy cell, lined with loose silken web.

Head superior. Attached to cocoon by apical spines (Pl. XIV., fig. 9 a).

Imago has a stout body, with crested thorax. General colour brown, with wavy marks on wings. The anterior legs are so thickly covered with hair, on tibiæ and upper tarsi, that I could not make out the spines, but I fancied that there were two weak ones at extremity of tibia. Maxilla well developed; labial palpi appear to have the two last joints about equal in size. Antennæ filiform.

Homoptera continua, Walk. (Pl. XV., fig. 9).

Mhow, September 14th, 1881.

Larva found on a small thorny shrub. General ground colour green; whitish along the dorsum. A yellow line divides each eye into two portions; a yellow line, on which are blue puncta, runs along the lateral margins of body. Legs: pectoral, six; ventral first pair obsolete, second pair rudimentary, third and fourth normal; anal legs, two. Semi-looping.

Pupa made in a leafy case, lined with spiders' web-like silk. The pupa is attached inside cocoon by the apical spines, and is covered with a white efflorescence.

I bred two imagines. General colour dark brown; one with plain wings, the second with two white transverse, carpet-pattern-like, bands across the upper wings, and a crested thorax.

Figure of larva on Plate XV., fig. 9.

HYPOGRAMMIDÆ.

Ercheia diversipennis, Walk.

Mhow, September 24th, 1881.

Larva found on grass. General colour a pale soft grey on superior surface; abdominal surface is of a fine deep pink or lake tint.

Cocoon made by binding down a leaf on itself, a piece of grass also attached.

Selepa celtis, Moore (Pl. XV., fig. 4).

Mhow, October 10th, 1881.

I found on a shrub, called by the natives "Bahera," two curious little brownish larvæ. They have their heads surmounted with several exuviæ of the heads of

the larva in its younger stages, and remind one very comically of the typical Jew "old clothes" man.

I omitted to sketch the larvæ before they had changed, but I believe they were clothed with short thin brown hair. Legs normal.

Cocoon formed of silk, somewhat like a boat overturned, with apparently an opening at one end, and curiously adorned by three larval "skulls" on its top like a sepulchral tumulus (see Plate XV., fig. 4).

Selepa curviferella, Walk. (Pl. XV., fig. 8).

Mhow, September 15th, 1881.

The larva feeds on the leaves of Gular, a species of *Ficus* common in India. General ground colour a yellowish orange. The head and three patches on dorsum black. White puncta also exist on the dorsal aspect of each segment. Abdomen of a yellow colour. Legs 6, 8, 2.

Cocoon generally subterraneous; of an oval form, composed of silk, with earthen particles adherent to its outside. Some larvæ, which I had confined by tying a muslin bag around a bunch of leaves actually growing on the tree, made cocoons on the leaves; but this was no doubt owing to the exigencies of their situation.

The above plan, when it can be carried out,—for instance, on one's own premises,—I found an excellent one, the larva getting its food in the best condition for nourishment, and under the nearest approach to natural conditions. It will, of course, only suit such larvæ as make cocoons on the leaves or stems of the food-plant. The objections are that in some cases the larvæ eat their way through the muslin bag and so escape, and that also they seem rather more liable to detection by lizards, &c., than when able to roam over a larger compass.

Figure of larva on Plate XV., fig. 8.

Tegna hyblælla, Walk. (Pl. XIV., fig. 10).

Mhow, August 15th, 1881.

The larva is very common on the leaves of Gular trees in my garden; it is naked and "maggot-like." When handled it ejects a yellow fluid from the mouth, and endeavours to escape by lowering itself by a filament of

silk to the ground. It spins a net on the leaf, partially curling it up, and sometimes rolling it; but as a general rule the margins of the leaf are merely approximated, and a cobweb-like net spun across from side to side, beneath which the larva feeds on the internal parenchyma of the leaf. A single larva will thus destroy several leaves, and when the former are numerous the tree which they infest soon presents a blasted appearance. At the end of October and early in November I found a second brood of these larvæ on the same trees.

The cocoon is of a dense leathery nature, and resembles a flat brown seed. It is made under a thin net of silk on one of the leaves inhabited by the larva, or in its immediate proximity.

This larva, in its appearance, habits, &c., seems to me to present a strong resemblance to that of *Scopula strenualis*, a leaf-roller. I have not compared the imagines, but I hazard the opinion that the life-history of each indicates a closer relation than that at present supposed to exist between them.

Figure of larva on Plate XIV., fig. 10.

OPHIUSIDÆ.

Sphingomorpha chlorea, Cramer. (Pl. XV., figs. 7, 7 a).

Mhow, September 3rd, 1881.

Larvæ rare in this locality. Found on leaves of a thorny shrub-like acacia, but having white bark. I only obtained three specimens during the whole season; they are very beautifully marked. Ground colour a light grass-green, with white spots and figures all over the dorsum and sides, the most noticeable being of an)(shape, and running along the centre line of back. At the spot marked "A" in figure is a transverse bar of an orange colour in the centre, and deep blue at each extremity, but visible only when the larva is in motion. The movement is semi-looping, and the habits of larva somewhat similar to those of the loopers. Front legs six, sienna-red colour; prolegs eight, but front pair much smaller than the remainder; anal two.

The pupa is formed in a cocoon of silk and clay under the surface of the ground, not attached by caudal end, and of a dull reddish brown colour, without any white efflorescence. Body unarmed.

The larvæ (three) went under ground on Sept. 6th: the imagines came out on Sept. 23rd and 24th. Curious collar on neck. Thorax clothed with hair, under which are large expanded, somewhat pear-shaped, scales. Antennæ in repose lie along back close to central suture of wings; they are long and filiform. Enormous plumes of hair on legs, especially anterior legs of males.

Figure of larva and pupa Plate XV., figs. 7, 7 a.

Achæa melicerta, Drury.

Mhow, August 28th, 1881.

The larva found feeding on the flower of the garden rose, also on the leaves of *Zizyphus jujuba* or Ber. General ground colour a velvety purplish grey. Rows of black puncta on side and dorsum; two red papillæ on dorsum near caudal end; two white puncta on dorsum just above anal legs. When the larva is in motion a velvety black patch with three white puncta on its posterior margin is seen on dorsum of thorax. Eyes white; two white dots on vertex. Movement semi-looping. Legs, six; prolegs, anterior pair rudimentary, remainder normal.

Cocoon formed by binding leaves together with silk into an oval cell; the interior is lined with fine silk. The pupa is fastened inside cell by anal hooks; it is covered with a coat of bluish white efflorescence, easily rubbed off, the pupa itself being of a greenish brown colour. Some specimens in confinement made cocoons of silk and gravel, &c., on the surface of earth in box, but this is not the natural mode. Inside male abdomen are dense brushes of fine long yellow golden hairs.

Ophiodes separans, Walk.

Mhow, September 7th, 1881.

Larva found on the leaves of Guava tree. General colour a pale soft grey; faint markings of light brown on body; a deep brown mark between each proleg on abdomen. No peculiar concealed patch on dorsum of thorax. Legs six; prolegs eight, but anterior pair smaller than the others.

Cocoon made by fastening two adjacent leaves together in such a natural manner that it would at first glance seem as if they had grown in that position; between the

surfaces of the leaves, bound together with a few silken ligaments, lies the pupa.

Pupa of a deep brown, almost black colour, fastened in cocoon by the numerous fine, hooked, apical spines. It is without any of the white efflorescence generally seen on the pupæ of those Noctuæ which make their cocoon of leaves and silk on the plant upon which they feed.

REMIGIIDÆ.

Remigia frugalis, Fabr.

Mhow, October 19th, 1881.

The larva is found on grass. The two anterior prolegs are obsolete. Movement looping. When the body is curved in the act of looping two black transverse bars become visible on dorsum of thorax, posterior to the last pair of legs.

I find that I have neglected to note the character of cocoon or pupa, but from memory I am under the impression that the transformation took place in an underground earthen cell.

Imagines of a general ground colour of brown; a transverse bar on upper wings near the posterior costæ. One specimen has densely plumed posterior legs; the other two are naked.

BOARMIIDÆ.

Hypochroma dispensata, Walk. (Pl. XIV., figs. 12, 12 a).

Mhow, October 14th, 1881.

Larva found on leaves of *Zizyphus jujuba*. Legs 6, 2, 2. Three anterior pairs of prolegs obsolete. Movement looping. Vertex bifid when viewed from above and behind.

Cocoon made on the surface of the ground, net-like, very thin silk, and the meshes large and open like those of a fishing-net; quite useless for purposes of concealment of pupa.

Pupa rather attenuated towards apex of abdomen.

Imago with delicate ashen-white wings, with fine black linear markings. The posterior costæ of the under wings project beyond those of the front wings. The position of the wings when the imago is at rest is horizontal, and they are partly extended at a considerable angle from the central line of body.

Figure of larva and pupa on Plate XIV., figs. 12, 12 a.

BOTIDIDÆ.

Botys molusalis, Walk.

Mhow, September 5th, 1881.

Larva feeds on a small nettle-like annual with a soft serrated leaf. It is naked and "maggot-like," body soft and translucent, of a delicate grass-green colour. Head black, and black marks on lateral margins of front thoracic segments. Legs 6, 8, 2.

The larva rolls over the leaf on which it feeds by attaching cables to the edge of one side, and then to the midrib; on tightening these the half leaf is formed into a tube, the whole operation being carried out in a rapid and very interesting manner. The larva then goes inside the roll, and completes the fortification under its protection.

The pupa is of a chestnut-colour, and is located inside the roll last inhabited by the larva, attached by a caudal ligature. No net is spun around it, nor is it enclosed in any description of cocoon.

Scopula strenualis, Walk.

Mhow, August, 1881.

The larvæ, which are abundant in some situations, feed on the leaves of the common Bambu of India. They bind the two edges of the long acuminate leaves together, or sometimes several leaves in a bundle, thus forming a long narrow cylinder, in which the larva lives and eats. One end of this cylinder is after a time filled with excrement; it is then deserted and a new one made. The larvæ appear to devour the inner parenchyma, and thus preserve the cylinder as a habitation while it also affords food. They are "maggot-like" in appearance, smooth, of a greenish yellow colour, and with sienna-red heads. Legs 6, 8, 2.

On searching many cases on the Bambu tree itself I found two pupæ inside one of the cylinders, under a fine network of silk of open texture, and also fastened down by the apex of abdomen. Eyes of pupa black; body a pale chestnut.

On Sept. 7th I removed a number of larvæ inhabiting fresh cylinders from the tree (without disturbing them from their habitations), and placed the whole on the top of soft earth, in a box covered with muslin to prevent

their escape. I judged the larvæ to be near their transformation. In a day or two I removed the dried-up cases, and examined the earth in the box; I found that the larvæ had buried themselves under ground, making a loose cocoon of earth and silk woven together.

Nov. 5th following, "I examined the cocoons, and found the larvæ unchanged in each, shrivelled up, dry, and dead. I can now find no larvæ on the Bambu in my garden."

Why should these larvæ have gone under ground in preference to undergoing their transformation in what would appear to be the natural situation, *viz.*, inside the cylinder, the cylinder being in each case available for the purpose?

Compare this larva and its habits with the larva of *Tegna hyblælla*; the resemblance appears to me to be great, yet the latter is placed amongst the Noctuæ.

EXPLANATION OF PLATES.

PLATE XIV.

- FIG. 1. Larva of *Terias Æsiope*.
 1a. Pupa of ditto.
 2. Larva of *Melanitis Ismene*.
 2a. Front view of head of ditto.
 2b. Pupa of ditto.
 3. Larva of *Symphædra thyelia*.
 3a. Pupa of ditto.
 4. Larva of *Dabarita subtilis*.
 4a. Male pupa of ditto.
 4b. Female pupa of ditto.
 5. Larva of *Euproctis lunata*.
 5a. Mass of eggs of ditto.
 5b. Female pupa of ditto.
 5c. Male pupa of ditto.
 6. Larva of *Chilena strigula*.
 6a. Cocoon of ditto.
 6b. Pupa of ditto.
 7. Pupa of *Perina nuda*.
 7a. Larva of ditto.
 7b. Ova of ditto, magnified and in section.

- FIG. 8. Larva of *Miresa albipuncta*.
 8a. Pupa of ditto.
 8b. Dorsal spine of larva of ditto, magnified.
 8c. Cocoon of ditto.
 9. Larva of *Homoptera solita*.
 9a. Pupa of ditto.
 10. Larva of *Tegna hyblæella*.
 11. Larva of *Celæna cano-rufa*.
 12. Larva of *Hypochroma dispensata*.
 12a. Pupa of ditto.
 13. Larva of *Plusia chrysitina*.
 13a. Pupa of ditto.
 14. Larva of *Aphendala tripartita*.

PLATE XV.

1. Full-grown larva of *Clanis cervina*.
 - 1a. Young larva of ditto.
 - 1b. Front of head of young larva of ditto.
2. Pupa of ditto.
3. *Lebeda Buddha*, male.
 - 3a. Pupa of ditto.
 - 3b. Larva of ditto.
4. Cocoon of *Selepa celtis*.
5. Larva of *Nioda fusiformis*.
 - 5a. Feathered hairs of caudal plume of ditto.
 - 5b. Side tufts of ditto.
 - 5c. White hairs of side plumes of ditto.
 - 5d. Dots on body of ditto.
 - 5e. Hair of front plume of ditto.
 - 5f. Pupa of ditto, front and back view.
- 6a. Labial palpus of *Perina nuda*.
- 6b. Posterior and medial leg of ditto.
- 6c. Anterior tibia of ditto.
- 6d. Male organs of ditto.
7. Larva of *Sphingomorpha chlorea*.
 - 7a. Pupa of ditto.
8. Larva of *Selepa curviferella*.
9. Larva of *Homoptera continua*.
10. Larva of *Trilocha albicollis*.
 - 10a. Cocoon of ditto.